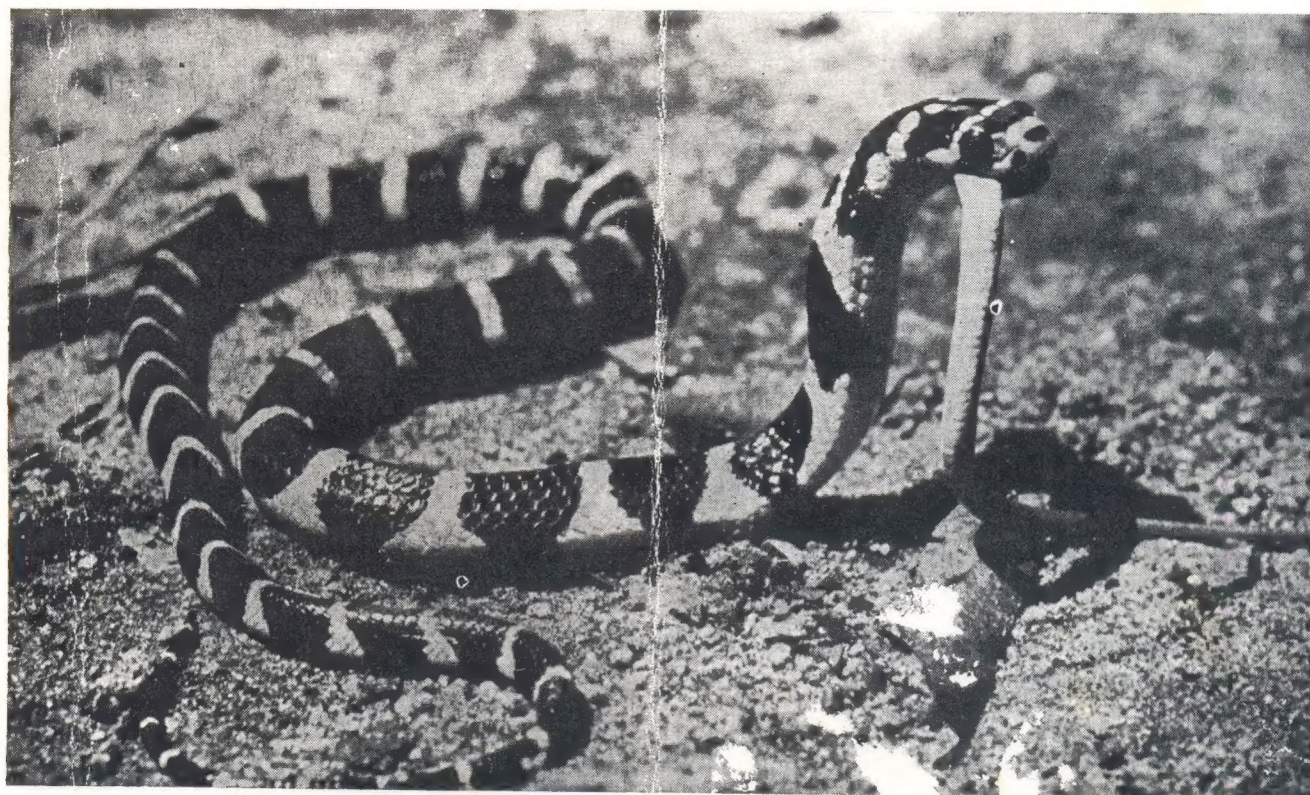
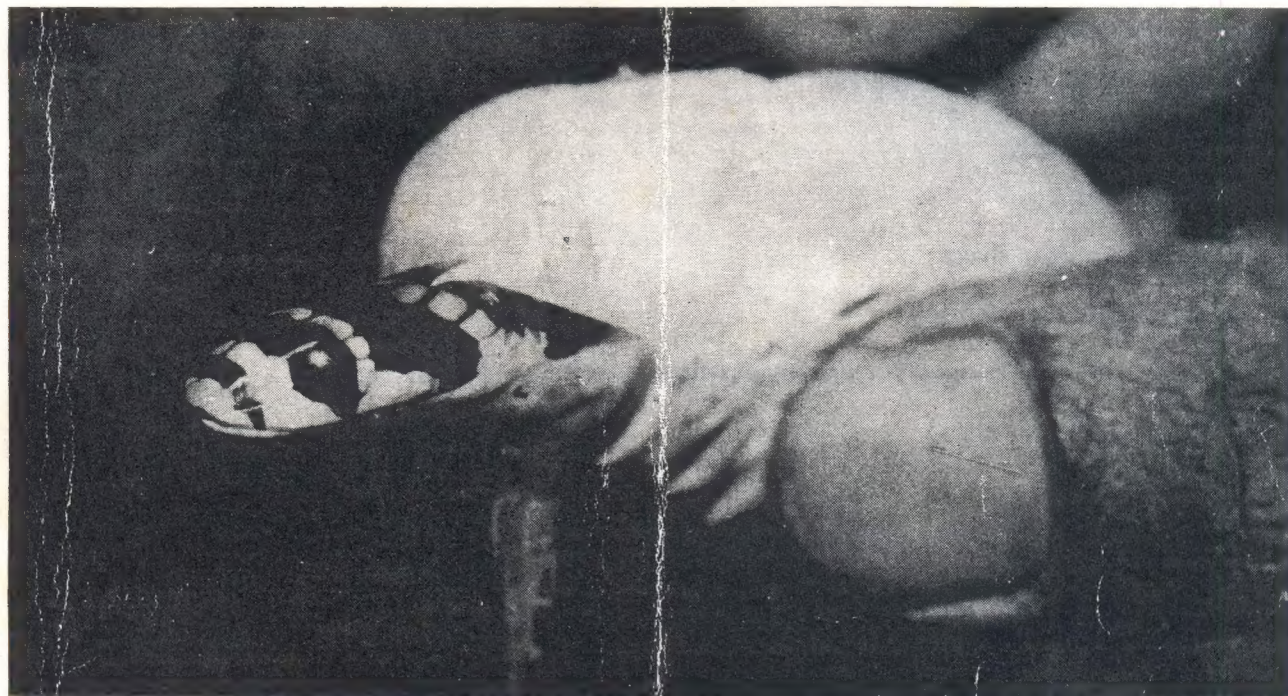


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CONTENTS

Title	Page
News from Madras Snake Park and Madras Crocodile Bank	1
King cobras bred at the Snake Park	2
An instance of the hump nosed viper <i>Hypnale hypnale</i> breeding in captivity	2
A new Sea-snake record for Madras	3
Notes from B. K. Saha	4
Snakebite notes	6
Birth of a bicephalus snake	7
Oral antidote for cobra poison	7
Irula Snake-catchers Co-operative Society activities suspended by Government	8
Freshwater turtles in India	9
Cites News	17
Record Length of the Brahminy River turtle <i>Hardella thurgi</i>	18
Study of <i>Trionyx nigricans</i> commences Bangladesh	19
Note on observations at the Olive ridley rookery at Gahirmatha, Orissa	19
Mrs Gandhi writes about turtles	21
Saving the Ridley turtle in Sundarbans-India	21
Watch-Frogs	23
Jaws III changes residence	24
Mugger Breeding Results at Madras Crocodile Bank-1984	25
New Books	27

Cover : top-king cobra (*Ophiophagus hannah*) hatching at the Snake Park and bottom-feeding on) (juvenile water snake

News from the MADRAS SNAKE PARK AND
MADRAS CROCODILE BANK

Our second serious attempt at breeding the Park's captive king cobras (Ophiophagus hannah) has been successful (see page 2).

Also bred at the Snake Park since the last Newsletter were the hump nosed viper (Hypnale hypnale), the flying snake (Chrysopelea ornata) and the black pond turtle (Melanochelys t. trijuga).

In addition, 10 Python molurus eggs which are presently being incubated are expected to hatch soon.

At the Crocodile Bank breeding of mugger, caiman and salties has not been upto our expectations (see page 25 & 26). We are however bursting at the seams with green iguanas (Iguana iguana), which are well into the third generation.

The Director attended a meeting of the Central Government committee on sea turtle conservation in July (see page 19 & 20).

J. Vijaya has left for the United States in order to work on her M.Sc. thesis on freshwater chelonians under Prof. E.O. Moll at Eastern Illinois University. The Crocodile Bank contributed Rs. 5000 toward her air fare.

Dr. Herndon G. Dowling, Professor of Biology at the New York University visited the Snake Park and Crocodile Bank in August.

Members of the Harvard Museum of Comparative Zoology tour who visited the Crocodile Bank in March this year have raised about \$6,000 as a donation to the Croc Bank. Our grateful thanks for their support and encouragement.

S N A K E

King cobras bred at the Snake Park

The newspaper and magazine reading public in India have been assailed by photographs and news reports of the 11 Ophiophagus hannah hatched during 28 June to 1 July (incubation period of 63 days). This is the first time the species has been bred outside of U.S.A.

In January this year the same 13, 5 ft. male borrowed last year came from the Mangalore Wildlife Trust on a breeding loan. The smallest of our three 8 year old females laid 24 eggs on 26/4/84. Only 12 of these were fertile, and a month after hatching, 6 survive. See cover for evidence.

An instance of the hump nosed viper Hypnale (= Angistrodon) hypnale breeding in captivity.

Although a common enough snake in the rain forests of southern India and Sri Lanka surprisingly little information is available on the breeding habits of the semi-terrestrial hump nosed pit viper Hypnale (= Angistrodon) hypnale. Smith (1943) mentions that the species is viviparous producing from 4 to 10 young. Henry (1925) records 5 young produced in June which measured 130 mm and De Silva (1980) mentions that a female in his collection produced 6 young and 2 infertile eggs in June and that the neonates ranged in length from 130-145 mm in total length and 1.53 - 2.10 grams in weight. This note may be the first breeding record for this species in India.

Two adult males and one adult female hump nosed pit viper were collected from a south Indian rain forest in October 1982 at an altitude of 500 mts. These were brought to the Madras Snake Park Trust and housed in a 50 cm X 20 cm glass fronted wooden cage in an air cooled room with a mean temperature of 29 C and relative humidity of about 90%. The snakes feed, and appear to thrive on, a diet comprised exclusively of house geckos (Hemidactylus frenatus). On 11 May, 1984 four live and one still born young were discovered in the cage. The young were identical to the adults in body pattern and coloration and, contrary to Henry's observation, had dark brown tail tips. By the hemipenis eversion technique it was possible to ascertain that of the live young three were males. The neonates were very active and on the third day attempted to bite when provoked. Tail vibration - a common reaction in adults of this species when provoked - was not observed. Also contrary to Henry's observation, the young did not wriggle their tail tips when offered food (small geckos). However, detailed observations could not be made as

the young died at 7 to 10 days of age inspite of having been provided an environment similar to that in which the adults thrive. Measurements of the adults and neonates are given in Tables I and II.

Table I: Adults (measured to the nearest half cm.)

Snout-vent	tail	total length	sex	remarks
1. 32.5	6	38.5	M	--
2. 31.0	5.5	36.5	M	--
3. 35.5	5	40.5	F	--

Table II: Neonates (measured to the nearest mm.)

1. 120	19	139	F	--
2. 124	20	144	M	--
3. 121	19	140	M	--
4. 121	20	141	M	--
5. 116	20	136	-	still born

Acknowledgements:

I am grateful to the Madras Snake Park Trust for facilities; to Mark Davidar for assistance and to Rom Whitaker for reviewing this note.

Shekar Dattatri
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- Henry, G.M. (1924): Notes on Aneistrodon hypnale, the hump nosed viper. Spol. Zeyl. 13(2) pp 257-258.
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A new Sea-Snake record for Madras

On 30/7/84 the editor and her younger son found a robust sea snake measuring 890 mm washed up on the shore at Vadanemmeli village, about 40 km. south of Madras. It was badly wounded (a single deep puncture wound was visible at midbody) and subsequently died and was preserved for the Madras Snake Park Trust museum collection. While alive it demonstrated a fair ability at terrestrial locomotion, often raising it's neck and head in the air as if "coming up for air". The nostrils were generally kept closed even while out of water and opened

only for breathing. For a Hydrophis this snake's head seems conspicuously large while the fangs are minute. The snake bit a plastic bucket repeatedly; no doubt this behaviour was an effect of the mortal injury.

The Snake has keyed out to be Hydrophis ornatus, the Cochin Banded Sea-snake, with a range all the way from the Arabian Gulf to Australia. The following description is from Harold Cogger (Reptiles and Amphibians of Australia, 1979): A moderate to heavily built snake, the body more or less uniform along its length. Grey or blue-grey above with 30-60 broad blackish transverse bars. Otherwise pale cream or whitish on the lower half of the body. Head shields large, regular. Body scales imbricate in 39-59 (42) rows at mid-body. Ventrals 240-340 (254), about twice as broad as adjacent body scales. Average total length 1 metre. (note: numbers in brackets refer to this specimen)

This description accurately fits the Madras specimen. The Australian race (referred to as a subspecies Ocellatus by M.A. Smith, 1943) has "a lateral series of dark-edged ocellate markings and smaller dark blotches" (Cogger 1979).

NOTES FROM B.K. SAHA:

On striped keel backs (Amphiesma stolata) and Indian cobras (Naja n. naja & N. n. kaouthia) from the Sundarbans.

Harendranagar, a village in the 24 Parganas District of West Bengal is situated about 20 km from the Coast of the Bay of Bengal and about 100 km away from the city of Calcutta. Rivers and ponds occupy a large part of the area and mangrove vegetation dominates.

Between July 9 and August 31, 1981 and October 5 and 26, 1981 I surveyed this region and would like to report the following observations:

Amphiesma stolata:

A total of 19 striped keel backs were seen, 5 of which were apparently new born young. The adults averaged 46 cm in total length, with a range of 29 - 60 cm. The 5 juveniles observed on October 22 averaged 16.2 cm in total length. All the snakes were seen during the day, on roadsides, gardens and paddy fields in that order.

Naja n. kaouthia

13 monocled cobras ranging in total length from 60 cm - 122.5 cm were seen. Of these, 7 (54%) were found in village huts, 2 in paddy fields, 2 in patches of jungle and 1 in a brick pile. 69% of the snakes were seen between 6 and 10 p.m; 3 between 1 and 3.30 A.M. and only one during the day (afternoon). Two color phases were noticed with the brownish type dominating over the blackish.

Naja n. naja

A single specimen measuring 95 cm at a pond side at 9.00 P.M. According to local peasants spectacled cobras were more common 6 to 7 years ago.

Snake catchers of Coochbehar

Last April I visited a colony of about 40 snake catchers at Paradubi village in Coochbehar district (north Bengal). Commonly known as Bajikars, they are muslims and have been catching snakes for the past four or five generations. The most commonly caught are rat snakes, cobras and Russell's vipers from the villages and forested areas of northern Bengal. They use what is known as a 'Khonta', a bamboo stick with an iron plate to dig into snake burrows. There are some 10 other snake catching families in adjoining villages also, and all these catchers sell to the local snake dealers. The current prices of an average sized cobra and rat snake is Rs.40/- and Rs.15/- respectively. The Bajikars also perform snake-charming acts in the local bazaar and at fairs and practice folk medicine, dispensing mythical 'remedies' to snakebite patients.

See also:

Ed. - Snake charmers of Samphoor village. Hamadryad, 7:1, Jan. '82
Ed. - Snake communities in India. Hamadryad, 8:2, May '83.

Snakebite in north Bengal

We now have enough horror stories about snakebite in Bengal to make a strong representation to the state government and the Madras Snake Park is perhaps the appropriate organisation to do this. Last year I visited three health centres in Coochbehar district: Mathabhanga Primary Health Centre, Ghoksadanga PHC and Angarkata PHC. Almost all the doctors I spoke with knew nothing about snakebite treatment. None of these centres had any antivenom serum. Snakebite patients who turn up are sent on to the Coochbehar District Hospital which is at least 40 km from each of the centres.

See also:

Ed. - Snakebite, Hamadryad 7:2, May 1982.
Ed. - Snakebite treatment in rural areas. Hamadryad 7:1, Jan. 1982.
Saha, S.G. Notes on snakebite in West Bengal. Hamadryad 8:1, Jan.1983.
Saha, S.G. An interesting snakebite case report. Hamadryad 8:3, September 1983.
Saha, S.G. Snakebite. Hamadryad 9:1, 1984.
Venkatramani, S.H. The venom vaccine. India Today, Dec. 15, 1983.
Whitaker, R. Common Indian Snakes - a field guide. 1978, Macmillans.

Snakes take over health centre

During the same pilgrimage to rural health centres, I discovered that during monsoon months, hordes of snakes take shelter within the buildings when adjoining paddy fields

become flooded. According to Mr. Kiran Das the S.I. of the clinic, spectacled cobras and banded kraits dominate, their favourite micro-habitats being the bathrooms and store-rooms. In two years 72 cobras and kraits have been killed by members of the staff.

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Snakebite notes

During 1967 to 1984 altogether 765 persons bitten by snakes were attended at Harendranagar Health Centre and Raidighi Rural Hospital in the district of 24 Parganas, in West Bengal. Of the 765 cases, poisonous manifestations were detected in only 105 cases. The species of snakes which inflicted these bites were cobra and common krait. No Russell's viper bite case was detected in the above period. Only one case of Trimeresurus erythrurus (a pit viper) bite was recorded. The 659 non-venomous bites were by 7 species: i) Checkered keel back water snake, ii) Common wolf snake, iii) Rat snake, iv) Bronzeback tree snake, v) Vine snake, vi) Dog faced water snake, vii) Common blind snake.

Bite sites (n 765)

Site of Bite	No. of cases.	%
Leg and thigh	85	11.2%
Foot	400	52.2%
Arm and Hand	165	21.5%
Head and other parts	115	15.1%

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- 5) Whitaker, R., Common Indian Snakes, The Macmillan Co. of India Ltd., New Delhi, 1978.

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Birth of a bicephalus snake

In April, one of our captive female Russell's vipers (Vipera russellii) gave birth to a two headed viperling (viperetee?). It was part of a 44 strong clutch and died a few minutes after birth. Both the heads were fully developed and isolated from each other, with venom apparatus and facial sense organs. No deformity was noticed on the heads. On conducting a detailed examination in the neck region we found a single trachea leading to the lungs.

Anil and Neelinkumar Khaire
Poona Serpentarium
'Usant' - Poona Satara Road
Poona 411 009

Oral antidote for cobra poison

Dr. J. Joseph Thas, Head of the Pharmacology Department, Post-graduate Centre, Government Siddha Medical College, Palayamkottai, South India has achieved "a breakthrough in the field of toxicology" according to Tamil Nadu Health Minister Dr. H. V. Hande, states a press report. He has found a "potential oral antidote" for cobra venom, and possibly for krait, Russell's viper and saw scaled viper venom as well.

The wonder drug comes from a common Indian plant Indigofera tictoria (sub family: Papilionaceae). Dr. Thas suggests the following practical applications for the present until a refined form is put on the market: "if fresh plants are available, it is better to give about four ounces of juice of the root along with some amount of pepper. If not, it is advisable to give 5 to 10 grams of leafy portion of the dry plant in powder form".

The claim is based on a two-year research programme which revealed "that the drug, when given orally, protected the life of 30 to 40 per cent of albino rats from the lethal dose of cobra venom. In other animals, the drug delayed death by more than 2-1/2 hours". "Another preparation of the same drug, a more potent form, when injected sub cutaneously along with poison, gave 100 per cent protection. This showed that the drug inactivated cobra venom.

"The drug is also rapidly absorbed orally. The blood / is samples collected 30 and 60 minutes after administration confirmed the presence of the drug".

The press report goes on to say that the State-owned Tamil Nadu Medical Plant Farms and Herbal Corporation has plans to make the drug widely available in hospitals and rural dispensaries. (QUOTES FROM THE INDIAN EXPRESS, 10/8/84)

Referring to the item "oral antidote for cobra poison" (IE 10.8.84), medical practitioners should object to this sort of premature reporting on the efficacy of a drug used for an emergency such as snake bite,

Orally administered drugs take many hours to be fully absorbed compared to the injection of venom which the snake "administers" directly into the blood and lymphatic systems of its victim.

Many chemicals have been proved to "inactivate" cobra venom when combined 'in vitro' which, according to the report, is how the injection trials were carried out. It is wrong to infer that because death was delayed in mice and "other animals" the same would be true in human victims of actual snake bite.

While this research must continue to be encouraged (considering the shortage of and practical difficulties of administering the only known effective remedy: anti venom serum), premature claims are irresponsible. To say that the State plans to make the drug available (without adequate field trials) is even worse.

Many of the estimated 500 or more annual fatalities due to snake bite in Tamil Nadu could be prevented if people were informed about antivenom, and if they could get it."

Following the publication of this letter Dr. Thas visited the Madras Snake Park and spoke with the Director. Dr. Thas reiterated his opinion on the efficacy of the drug. He said that he had studied its action in detail and had confirmed that the drug could actually reverse the blockage caused by the neurotoxin at the neuro-muscular junction. He opined that since cobra bite victims invariably die due to respiratory paralysis caused by blockage at the neuro-muscular junction, the blockage reversing ability of the drug could save a victim of cobra bite.

For the sake of the many thousand snake bite victims in India each year, we can only hope he is right.

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C/o, Madras Snake Park Trust
Madras-22

Irula Snake-catchers Co-operative Society activities
suspended by Government

The Forests and Fisheries Department of Tamil Nadu has suspended the activities of the Society related to snake catching and venom extraction, pending completion of their investigation of reptile specimens found at the Snake Park. This is drastically affecting the 60 Irula families who sell snakes to the Co-operative.

T U R T L E

Freshwater turtles in India: their status, conservation and management (Excerpts from a Indo-American project report by Edward O. Moll, Chairman of IUCN/SSC Freshwater Chelonian Specialist Group)

The objectives of this research conducted between Sept. '82 and June '83 were to obtain the following types of information concerning Indian species of turtles.

1. Levels of exploitation for each species.
2. Localities of major nesting sites.
3. Relative abundance of important species.
4. Ecological data (distribution, habitat etc.)
5. Evidence of population declines.
6. Present and future threats to populations.

Our procedure for obtaining this information has been to interview government wildlife officials, fishermen, market vendors and other knowledgeable persons. In addition we visited selected sites and directly sampled and observed characteristics of turtle populations there. Results of our findings are presented below.

The diverse freshwater turtle fauna of India comprises some 22 species belonging to two families - the pond turtles, Emydidae (16) and the softshells, Trionychidae (6). Both are widespread groups showing maximum diversification in the Oriental Region. Being large and often locally abundant, turtles in terms of biomass may be major vertebrates in aquatic ecosystems (Bury 1979). They can be of value to man both through their ecological role or more directly as a source of protein and certain other products.

Ecology:- The majority of Chelonians for which information is available feed chiefly at the primary consumer level (herbivores) as adults. Most however are at least somewhat opportunistic and pure herbivores (or carnivores) are rare. Even among the softshells, a group admirably adapted for carnivory, diets of certain species (e.g. Trionyx gangeticus, T. leithii, Lissemys punctata) may comprise considerable amounts of vegetation.

For the most part there is little competition between turtles and man for food. The aquatic plants eaten by turtles are little utilized by man and fishermen benefit indirectly as the turtles help to control plant growth and to maintain open areas of water necessary for most fishing methods. Turtles will eat some fish. However, in a natural (unconfined) habitat, most species have neither the speed nor manoeuvrability to catch healthy fish and thus have little effect on the fish population.

Turtles are excellent scavengers and it is here that they perform one of their most important benefits for man. In parts of India where aquatic burial is common, large numbers of turtles particularly softshells (e.g. Trionyx gangeticus) are also present to feed on the bodies. These turtles help to purify the water by hastening decomposition and recycling of the nutrients.

Generally the aquatic turtles of India can be divided into two somewhat overlapping habitat groups- those inhabiting rivers and streams and those occupying the more lentic habitats such as lakes, ponds, swamps, and marshes. Members of the former groups tend to be highly aquatic (seldom leaving the water except to bask or nest); powerful swimmers that may reach a very large size. This group includes the soft shells (Trionyx, Chitra and Pelochelys and the Emydids, Batagur and Kachuga). The lentic species typically comprise relatively smaller, often semiaquatic forms such as Cuora, Cyclemys, Geoclemys, Melanochelys, Morenia. Hardella which also falls in this group attains an impressively large size (to 500 mm shell length). These categories are far from absolute. Large Trionyx can also be found in lakes and on occasion even in surprisingly small ponds. Highly generalized species such as Lissemys punctata are commonly found in both habitats. Nevertheless these habitats seem to be optimum for the species listed.

Reproductive cycles of the Indian species are poorly known but from data collected over the 10 months of this survey, the trionychids and emydids appear to have different peak seasons. The major time for nesting of trionychids appears to be August, through November whereas the Kachugas, Batagur and Hardella, nest between December and May.

Exploitation:- Freshwater turtles in India are most commonly exploited as food and/or medicine. Unlike marine turtles they do not appear to be in demand for jewelry, tourist souvenirs or for their leathery skin. Turtles are an especially valuable resource in that most convert little used food items (i.e. aquatic plants and lesser animal groups) into needed and chronically scarce animal protein.

West Bengal is the most important state for turtle consumption. It is also the center of an extensive turtle marketing industry which operates throughout much of the Ganges and Mahanadi River systems. This highly organized industry comprises turtle catchers, dealers, wholesalers, and retailers. Dealers ship the turtle in large baskets by rail or occasionally by truck to the wholesalers. By far the largest wholesale market is located at Howrah. A market survey made in late 1981 and early 1982 estimated that 50,000 to 75,000 Indian flap shells (Lissemys punctata) 7000 to 8000 large trionychids (chiefly Trionyx gangeticus, Chitra indica, Trionyx hurum) and at least 1000 to 15000 emydids were coming into the Howrah markets annually (Vijaya and Manna, unpublished). The latter is probably an underestimate, for when we visited the Howrah markets in May, 1983 over 350 large hardshells were being auctioned off in one day. During winter season 100 - 200 sea turtles (Lepidochelys olivacea) may be trucked in weekly from Digha. Vendors from all over West Bengal come to Howrah to attend the daily turtle auctions.

The wholesale prices from Howrah market in May were ca. 10Rs/kilogram for soft shells and 5Rs/kilogram for hardshells. Using the aforementioned annual estimates of turtles coming into Howrah and estimating 8Kg for an average large softshell, .75 kg for the average Lissemys punctata and 8 kg for an average emydid, we roughly estimated that the rupee income from turtles at Howrah alone may be between 12 & 13 lakhs.

Threats to the Resource:- One of the most obvious threats to India's turtle resources is over exploitation. Certainly the great demand for turtle meat in West Bengal has created a drain on turtle populations throughout the Ganges and associated river system. However there are few baseline data for comparison, so it is difficult to ascertain just how serious this drain has been. A few indications have been derived from the old literature and from talking with long time fisherman and market vendors in the study areas.

As West Bengal is the main center of turtle consumption in India, it might be expected that problems with over exploitation would be most obvious here. Biswas and Biswas (in press) state that in recent years the turtle catch from West Bengal has dwindled to the point that it is no longer profitable to fish for them. Vijaya and Manna's (unpublished) report made similar observations in their 1981-1982 survey. They concluded that few turtles were now being caught in West Bengal and these are usually sent to local markets. Catches within Bengal are highest at Murshidbad on the Ganges which still sends 2-3 baskets of turtles per month in peak months to the Sealdah markets in Calcutta.

With sources within the state near exhausted, West Bengal must reach farther a field for supplies of turtles. These now are obtained from Orissa, Bihar, Madhya Pradesh, Uttar Pradesh and to some extent from Assam and Bangladesh. Presently the most common market species in order of abundance are Lissemys punctata, Trionyx gangeticus, Trionyx hurum, Kachuga dhongoka, Chitra indica, and Hardella thurii with Melanochelys trijuga indepeninsularis, and the smaller Kachugas (smithi, tecta, tenteria) showing up periodically.

Datagur baska is an example of at least one species which was once very common in the Calcutta markets (Gunther 1864) but now is never seen. We did however locate a few specimens in the Indian Sunderbans on this survey indicating that the species is not yet extinct in India. Several other species though still showing up in the markets have been seriously declining according to market vendors. Hardella thurii, Kachuga kachuga, and Geoclemys hamiltoni are examples -- the latter two being particularly rare in markets. Acharji (1955) in a 1954 survey of turtles on the Ganges River near Rajmahal found Hardella thurii and Kachuga kachuga to be "abundant" and "very common" respectively. When we visited this locality in March 1983 we found no evidence of either species though Kachuga dhongoka and Kachuga smithi were common.

Habitat Alteration: Habitat alteration is perhaps even more important than over exploitation in the decline of India's freshwater resources. However, as these factors act indirectly on turtle populations it is far more difficult to determine their importance.

Management

Based on findings from these surveys, I recommend the following actions to stem present declines and to allow rebuilding of damaged populations.

Revision of Wildlife Act and of CITES Listings:- The turtles listed on Schedule I of the Wildlife (Protection) Act of 1972 and on Appendix I of the Convention of International Trade in Endangered species are in many cases the most common species in India. Others which are rare and threatened with extinction are not listed on any schedule. Table 2 summarizes my recommendations for revision of these schedules and appendices as stipulated in section 61 of the Wildlife (Protection) Act, 1972.

The important market species should be placed in schedule IV to allow monitoring and regulation of the trade. As schedule IV requires permits possibly some of the permit charges could be used at least in part, to support conservation and manggement programs for these species.

Protective Measures: Many of the proposed Schedule IV species listed in Table 2 are endangered because of their market demand. These could be listed on Schedule I to protect them but this has proved ineffective in the past (the 3 most common market species are on Schedule I) and it shuts off the value of the resource to the Indian people.

As alternatives to total protection, which has proved ineffective in the past I suggest one or more of the following measures be adopted to protect populations and allow for recruitment.

Closed seasons:- The key period in an animal's life history is the reproductive season. Unless sufficient numbers of young are recruited to replace those that die, a population will decline. Female turtles are particularly vulnerable at this time. When they leave the safety of their aquatic habitat, they become easy prey to a variety of predators including man. Prohibiting collection of turtles during their nesting season should lead to more recruitment and growth of populations.

From data collected on these surveys, it appears that the system could be very simple. The peak period for nesting of the softshells (trionychids) is August through November and for most hard shells (emydids) is January through April. Two closed seasons, one for each group, should be legislated. It should be illegal to market soft shells from August to December and hardshells from January to May. Identification of individual species would not be necessary. Enforcement officials would only have to make the simple distinction between a hardshelled and a softshelled species.

Hatcheries and protected nesting areas:- Another common method of insuring reproductive success is to set up egg hatcheries or to protect the beaches from predators during the nesting season. I recently worked with the Madhya Pradesh Forest Department to initiate such a hatchery for Kachuga kachuga

and K. dhongoka at the National Chambal River Sanctuary Headquarters near Morena. The main drawback of hatcheries however is that incubation temperature can determine the sex of the hatchlings and it is possible to produce all males unless temperatures are carefully adjusted.

A simpler and usually cheaper method is to hire one to several personnel to patrol the nesting beaches during the peak periods. Nests can be protected from many predators by putting wire cages over them for a couple of weeks after which time the characteristics that allow a predator to locate the nest will have largely disappeared. Still another simple technique which has been successful with protecting sea turtle nests is to dig up the nest and replant the eggs a few yards away (Stancyk, 1981). Again this seems to eliminate many of the characteristics that a predator utilizes to find a nest.

The sanctuary or source area concept:- This technique seeks to completely protect an area containing a nucleus of breeding individuals. This population can then increase in size until population forces dispersal out of the protected area. Then the turtles can then be utilized by the local population. So long as the breeding nucleus is protected the population will not become extinct.

Captive breeding programs:- although every attempt should be made to maintain species in their natural environment, it may be necessary in some cases to initiate captive breeding programs to restock dwindling populations. Such programs can also provide valuable information on the reproductive biology of the species.

The Madras Crocodile Bank already has facilities for such a program and feasibility studies have already been initiated for certain species. Breeding stock is currently available for Heosemys silvatica, Hardella thurjii and Kachuga dhongoka. Over the next year, pairs of Batagur baska and Kachuga kachuga will also be sought for the program. Such pilot projects should be encouraged to work out the techniques involved in breeding these animals in captivity.

Another type of captive breeding program deserving study is that for commercial purposes. In China, Japan and Thailand, soft-shell turtles are being raised in ponds for markets. In particular the feasibility of such projects should be investigated in West Bengal.

The following species of turtles show potential for such captive ventures: The Indian flap shell (Lissemys punctata) a highly adaptable omnivorous species which does well in ponds is already one of the most popular market species. The Indian softshell, Trionyx gangeticus is a much larger omnivorous species which also adapts well to pond type habitats (they are often kept in temple tanks) and is very popular in the markets.

Wither of the above would make suitable test animals for a pilot farming program. As for turtles suitable for private ponds again Lissemys should be investigated but as it is a meat eater it could reduce fish production. One of the more vegetarian emydids (eg. Kachuga tecta, Kachuga tentoria or Hardella thurji) might be more suitable for coexisting with fish.

Enforcement:- In the past enforcement of the Wildlife (Protection) Act as it pertains to turtles has been very lax. This was evident in our visits to the West Bengal markets where we found that the three most common market species Lissemys punctata, Trionyx gangeticus and T. hurum were all on Schedule I. Obviously the Wildlife Act can only be effective if proper enforcement is provided.

- (1) One of the chief problems of enforcing the existing regulations is that few officers in state forest departments can identify the turtles in Schedule I. I recommend a Workshop on turtle (reptile) identification be held early next year. I would volunteer to conduct such a workshop if the Indian government would take charge of the organization. At the workshop participants would be given an opportunity to see the important market and Schedule I species and would be taught the characteristics needed to identify them. They would further be provided with simplified keys that would aid them in identifying either whole animals or their skeletons.
- (2) Enforcement of the Wildlife laws as they apply to turtles should be concentrated in two areas - the West Bengal markets and the railways. As the West Bengal markets are by far the largest outlet for turtle sales, proper control here will greatly reduce the depletion of populations in Orissa, Bihar, Uttar Pradesh and Madhya Pradesh. Railways should also be encouraged to carefully check transit permits for turtle shipments. According to vendors many shipments are sent to Howrah markets labelled as fish. However they are labelled it is obvious that large quantities of Schedule I species are being transported across state lines by rail without proper permits.

Education:- The long term success of any conservation program requires public support. Cooperation is more likely when the public understands the needs for the program (IUCN 1980). A turtle fisherman is far more likely to respect the law (a closed season, a sanctuary area) if he understands that these practices are designed to benefit him by increasing the numbers of turtles. It is recommended that wildlife departments designate public relations personnel to disseminate educational information to the public concerning game laws and conservation programs. The use of mass media should be considered along with on-site visits to villages in key areas and the provision of environmental education in the school. In respect to the latter I am currently working with World Wildlife Fund-India and Mr. P.C. Roy Chowdhury, Regional Director of Wildlife in Calcutta to prepare a pamphlet on turtles and their conservation (written in 3 or 4 languages) for use by school children in India.

Recommendations for changes in listing in the Indian Wildlife (Protection) Act and Status of Species and localities surveyed are given in Tables II and III.

SUGGESTED REVISIONS IN TURTLE NESTINGS ON THE
WILDLIFE (PROTECTION) ACT (WL (P))

<u>CONVENTION ON INTERNATIONAL TRADE IN ENDANGERED SPECIES AND ON THE APPENDICES OF THE</u>				
<u>Species</u>	<u>WL(P)A Schedule</u>	<u>CITES Appendix</u>	<u>WL(P)A Schedule</u>	<u>CITES Appendix</u>
<u>Datagur baska</u>	--	I	I	I
<u>Geoclemys homaltoni</u>	--	I	I	I
<u>Harcella thurii</u>	--	--	IV	--
<u>Hessemys silvatica</u>	--	--	I	--
<u>Kachuga tecta</u>	I	I	--	--
<u>Kachuga kachuga</u>	--	--	I	--
<u>Kachuga dhonoka</u>	--	--	IV	--
<u>Melanochelys tricarinata</u>	IV	I	IV	I
<u>Obitra indica</u>	IV	--	IV	--
<u>Pelochelys bibroni</u>	I	--	IV	--
<u>Trionyx gangeticus</u>	I	I	IV	II
<u>Trionyx hurum</u>	I	I	IV	II
<u>Trionyx leithii</u>	IV	--	IV	--
<u>Lissemys punctata</u>	I	I	IV	--

151

- * 1. Serious declines in population numbers or small population numbers
 2. Limited range with threats to habitats
 3. Survey indicates moderate to large populations
 4. More extensive range than previously known
 5. Heavy trade in this species needs monitoring
 6. Insufficient data available on species.

**Table 3 DISTRIBUTION AND RELATIVE ABUNDANCE AND STATUS OF TURTLES IN THE 20 LOCALITIES* SURVEYED
SEPTEMBER 1982 - JUNE 1982**

**

Species	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	Status in India	
TRIONYCHIDAE																						
<u>Lissemys punctata</u>	-	3	3	-	-	3	3	3	3	-	3	3	3	3	2	-	-	-	3	3	I	
<u>Citra indica</u>	-	1	-	-	-	1	2	-	4	-	-	-	2	-	-	-	-	-	-	-	III	
<u>Lochelys bibroni</u>	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	III	
<u>Ionvx cangeticus</u>	-	-	-	-	-	3	3	3	3	-	2	-	2	-	3	3	3	-	-	-	I	
<u>ionvx hurum</u>	-	-	-	-	-	-	-	-	-	-	-	-	3	3	-	1	3	-	-	-	I	
<u>ionvx leithii</u>	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	I	
YDIDAE																						
<u>temur baska</u>	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	IV	
<u>celomys hamiltoni</u>	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	III	
<u>asomys silvatica</u>	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I	
<u>colia thurii</u>	-	-	2	2	-	-	-	-	-	-	-	-	2	-	-	2	2	-	-	-	III	
<u>luaga dhongoka</u>	-	-	-	-	-	3	-	3	-	-	4	-	2	-	-	4	2	-	-	-	I	
<u>luaga kachuga</u>	-	-	-	-	-	2	-	2	-	-	-	-	1	-	-	-	1	-	-	-	III	
<u>luaga smithi</u>	-	-	-	-	2	-	-	-	-	3	-	-	3	-	-	-	-	-	-	-	I	
<u>luaga tecta</u>	-	-	-	3	2	-	-	-	-	-	-	-	3	-	2	-	-	-	-	-	I	
<u>luaga contoria</u>	-	3	-	3	2	4	3	4	4	-	2	-	3	-	-	-	-	-	-	-	I	
<u>ionochelys trijuga</u>	3	-	3	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	3	3	I	
<u>tricarinata</u>	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	IV	
<u>luaga petersi</u>	-	-	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	II	
ODININIDAE																						
<u>hielone elegans</u>	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	I	
<u>longata</u>	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	?	
<u>ravancorica</u>	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	II	

1. Rare 2. Uncommon 3. Common 4. Abundant

* LOCALITIES SURVEYED

1. Vicinity of Anaipandam, Chalakudy, District, Kerala
2. Godavari River, Manthani to Coast, Andhra Pradesh
3. Vicinity of Hyderabad, Andhra Pradesh
4. Gomti River and vicinity near Lucknow, Uttar Pradesh
5. Ghagra River, Katarniaghat Gharial Sanctuary, vicinity of Girija Barrage, Bhariach District, Uttar Pradesh
6. Chambal River, Morena and Bhind Districts, Madhya Pradesh
7. Kuarr and Sank Rivers, Vicinity of Morena, Madhya Pradesh
8. Yamuna River, Bah to Etawah, Uttar Pradesh
9. Mahanadi River, Tikerpara to Cuttack, Orissa
10. Subarnarekha River, Udaipur Village 3 mi NE Chandaeswar, Orissa
11. Ganges Forest, Kahalgaon to Rajmahal, Bihar
12. Saranada Forest, Singhbhum District, Bihar
13. Gandak River and vicinity, Gandak Dam to Bettiah, West Champaran District, Bihar
14. Burhi Gandak River, Muzaffarpur, Bihar
15. Narmada River Maheshwar to Hosangabad, Madhya Pradesh
16. Howrah Markets, West Bengal
17. Markets in Jalpaiguri District, West Bengal
18. Sundarbans, 24 Parganas District, West Bengal
19. Vicinity of Madras, Tamil Nadu
20. Moyar, Bhavani and Amaravati Tributaries of the Cauvery River, Periyar, Nilgiris and Coimbatore Districts, Tamil Nadu.

** LIST OF CATEGORIES

- I Widespread and relatively common over the majority of the range.
- II Restricted range but relatively common within the range
- III Widespread but uncommon over the majority of the range
- IV Restricted range and uncommon within the known range.
-

CITES NEWS

Lissemys topples from Appendix I

The Endangered Species Bulletin (U.S. Fish and Wildlife Service) for March 1984 puts the status of Lissemys punctata in the proper perspective:

"The Indian flap-shelled turtle (Lissemys punctata punctata) is a 15 to 28 cm brown, soft-shelled species found on the Indian subcontinent and on Sri Lanka. Its original listing as Endangered was based on a recommendation by Bangladesh that the species be included on Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). As a result of its inclusion on Appendix I of CITES, the Service subsequently (1976) listed the turtle as Endangered. However, as part of the Service's continuing effort to ensure that the legal status of listed species reflects their true biological status, a literature review

on this turtle was recently conducted. No supporting evidence justifying Endangered classification could be found. The Service then contacted a number of scientists to determine what field data might support the listing, and the unanimous response was that there was no justification for retaining the turtle's listed status. The species in fact may be the most abundant freshwater turtle in India. After studying the data, the Service concluded that the Indian flapshelled turtle is neither Endangered nor Threatened and the species has been removed from the list.

However, the removal from protection under the Act does not affect its CITES status, and it remains subject to Appendix I trade restrictions. (* United States Fish & Wildlife Service)

India has a long way to go before she gets her Act (Wildlife) together. Naturalists don't dare touch the commonest reptiles while rare, endangered species can be annihilated with impunity.

Record Length of the Brahminy River Turtle *Hardella thurgi*

An unusually large female brahminy river turtle (*Hardella thurgi*) was seen at the fish and turtle wholesale market at Howrah near Calcutta in July 1984. While Pritchard (1979) states that the species reaches at least 21 inches (533 mm) in length, and Smith (1931) quotes that the length attained is 19.7 inches (500 mm.), the specimen in question had a carapace length of 24 inches (610 mm).

In West Bengal markets, where these non-aggressive turtles are called 'Kalikatta' (no doubt due to their dark colour) females are more common than males, because they are almost three times as large and hence much more in demand for their flesh. *Hardella*, incidentally, is the commonest species of hardshelled turtle in the market. Other emydines include the three striped roofed turtle *Kachuga dhongoka*, painted roofed turtle *K. kachuga* and spotted pond turtle *Geoclemys hamiltoni*. The last two species are somewhat rare in the market.

As reported by Vijaya (1983), turtle dealers claim that *Hardella* lays its eggs underwater, which seems to be a biological impossibility with reptiles as the developing embryo which is air breathing, would drown if the egg is kept submerged. But then few zoologists were willing to believe that a mammal could lay eggs, when the platypus first hit the news!

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Indraneil Das
18/20, Ballygunge Place (EAST)
CALCUTTA 700 019

Study of *Trionyx nigricans* commences in Bangladesh.

Farid Ahsan, a lecturer in the Department of Zoology, University of Chittagong, Bangladesh has commenced a research project on *Trionyx nigricans*, a 'sacred' softshelled turtle apparently endemic to a single temple tank in Chittagong, and consequently, one of the rarest and least known freshwater checlonians in the world (if proved to be a valid species-R.W.). In a recent letter Farid says he is carrying out weekly counts and juveniles collected from the "Byazid Bostani Mazar's hilly area" are feeding in the laboratory. Plastic numbered tags supplied by the Crocodile Bank could not be used unfortunately, due to the religious protection the turtles enjoy.

(See page 247 of the IUCN Amphibia - Reptilia Red Data Book, Part I, 1982 for an account of this species.)

Note on observations at the Olive ridley rookery at Gahirmatha, Orissa

The following notes are based on observations made during my visit in January/February 1984 (see Hamadryad 9(2) p. 12).

1. The use of unshaded petromax lamps and bright torches should be carefully controlled during the arribada period. Campsites must be situated behind the sand dunes and all lights dimmed and/or shaded.
2. The Research Officer should be given further support in terms of equipment and personnel (i.e. he has no adequate camera, film, typewriter, two way VHF radio or assistant officer).
3. It is agreed that the casuarina planting and palisade construction by the coastal protection wing of the Orissa Forest Dept. is ill advised when it actually impinges on the nesting beach such as is happening at Habali Khati. Erosion and cyclone damage is certainly an important factor to consider (see No.6) but more study is urgently indicated into this problem.
4. Regarding tagging, it is felt that if the Orissa Forest Dept. can supply the trained personnel to do the job well, they should be encouraged to continue the programme at Gahirmatha and extend the tagging programme to the other Orissa mass nesting beaches. If the Dept. has any difficulties in maintaining the programme they could seek the help of CMFRI which will be responsible for the tagging programme throughout the rest of India.

5. It is reported that the second arribada took place between 24/3/84 and 7/4/84 with an estimated 8 lakhs females coming ashore to lay during this period. The fact that this figure is more than double of any of the previous estimates indicates how much we have yet to learn about the ridley population. For example, could these large numbers possibly reflect a response to the protection of the nesting beach which started in 1976? Eight years may be enough time for the 1976 survivors to have matured and there are indications from Thiruvannmiyur beach in Madras and Bentota in Sri Lanka that ten years of egg protection and hatchling releases have paid off, though quantitative data is lacking. Again, research is indicated. The second arribada coincides with the hatching of the nests of the first arribada. Forest staff observed hundreds (or perhaps thousands) of hatchling turtles being crawled over by emerging and returning adult females while the hatchlings tried to make their way to the sea. The hatching was reported on by WWF worker Indrancil Das from Calcutta, in a short note in "Hamadryad" (9 No.2, p 12)

6. Satish Bhaskar visited Gahirmatha during April and reported that one entire section of the beach had been destroyed by wave action. The erosion of the sand had exposed literally thousands of nests and Satish has pictures of lakhs of eggs lying along the shoreline and floating in the sea. The whole dynamic pattern of events at Gahirmatha really deserves much more scientific input than it is receiving now.

7. Because of the many difficulties experienced in apprehending, remanding and convicting turtle poachers (even with the welcome help of the Coast Guard) it is essential that the Digha, Howrah and Siliguri links in the sea turtle trade be snapped by efficient land based policing at these three despatch and wholesale marketing centers.

8. It is suggested that a preliminary analysis of the available data be made and various extrapolations carried out concerning the commercial management of the Orissa ridley population. While implementation of a management programme may be premature, the exercise will indicate what data needs further collection and which options may be the most appropriate.

Romulus Whitaker
Sea Turtle Specialist Group
Dept. of Environment
Govt. of India.

P.S. Submitted at last Sea Turtle Specialist Group Meeting
in Delhi.

MRS GANDHI WRITES ABOUT TURTLES

Professor Archie Carr, Chairman of the Marine Turtle Group, received the following letter from Mrs Gandhi after he had requested her help to protect turtles in India:

"I have received your letter of the 11th March. There have been other similar letters about the protection of marine turtles. Even before these reports were received last year, I called for immediate action through the Orissa State Government and the Coast Guard of the Indian Navy to prevent the hunting of these turtles or for collection of eggs by blunthcombers. All coastal States in our country have been asked to be vigilant in this matter. You will be glad to know that our States have also started taking steps to collect the eggs and get them hatched in a central hatchery and release the young ones into the sea. We are aware of the importance of the endangered species to our eco-systems."

"Our concerned Ministries here and in the State Governments have been asked to take the required measures to see that the olive ridley turtle, which is an endangered species, is looked after."

Saving the Ridley turtle in Sunderbans - India

The Olive Ridley (Lepidochelys olivacea) starts visiting the Sunderbans (West Bengal) beaches from the first week of December. Eggs are predated by humans (H. sapiens) water monitors (V. salvator) and wild pig (Sus scrofa). Hatchlings are devoured by sea gulls, whiskered terns, brahminy kites and other predators; there are also reports of the cunning Sunderbans tiger lying camouflaged in the sand, waiting for female Ridelys to start laying.

In order to raise hatching survival, a search for Ridley nests are carried out in March/83 in a barren island of about 1.5 sq. km. area facing the Bay of Bengal, a number of nests were located. Three clutches were dug up on 4.3.83 following the flipper trails of the turtle. A slightly older nest containing 127 eggs and two 24 hour old nests containing 179 eggs were also collected in iron buckets with sand. Nest temperature was 28°C. The eggs were brought by motor launch to Sajnakhali, a distance of more than 100 kms. On 5.3.83 the eggs were buried in 45 cm deep artificial egg chambers in sand pit. Nest temperatures were recorded at noon and are given below:-

Temp. (C°) at 12 noon

	<u>5.3.83</u>	<u>12.3.83</u>	<u>26.3.83</u>	<u>20.4.83</u>	<u>26.4.83</u>	<u>1.5.83</u>	<u>2.5.83</u>
Pit 1=	24°	27°	27°	30°	31½°	30°	-
Pit 2=	24°	27°	27°	29½°	30°	31°	30°
Pit 3=	24°	27°	27°	29½°	29½°	30°	30°

The first hatchling appeared on 2.5.83, i.e. on the 59th day after collection of eggs. Out of 485 eggs (127+179+179) collected, 248 hatched (51%) as per the following schedule(2)

	Pit No.1 (179 eggs)	Pit No.2 (179 eggs)	Pit No.3 (127 eggs)
02.5.83	80	-	-
03.5.83	5	-	-
04.5.83	-	-	-
05.5.83	10	38	-
06.5.83	21	32	-
07.5.83	2	34	5
08.5.83	-	2	-
09.5.83	-	9	6
10.5.83	-	-	1
11.5.83	-	-	1
	<u>118</u>	<u>115</u>	<u>13</u>

Egg sizes with a range of 4 to 4.2 cm. averaged 4.1 cm(dia).

The sizes of hatchlings were as below:

Max^m = 7 cm X 3.7 cm.

Min^m = 6.5 cm X 3.4 cm.

Av. = 6.8 cm X 3.5 cm.

Weight of Hatchling: Max^m = 20 g.

Min^m = 16 g.

Av. = 18 g.

The hatchlings were given a fish dinnerⁿ and subsequently released in the ocean.

At Bhagabatpur crocodile farm in Sundarbans some Ridley eggs were collected from the same location on 16.3.83 and were hatched in artificial nests. 11 hatchlings were reared in a cement water tank for about a year. Their weights at eight months of age (ie. Jan '84) is given below:

Max^m = 1450 g.

Min^m = 600 g.

Av. = 1020 g.

The turtles are fed with prawn and fish in the tank and carapace is regularly brushed to avoid fungal infection.

During 1984 also eggs were collected on 4.3.84 from a clutch of 139 (average dia of 4.2 cm.)

The turtle island and the beaches of Sundarbans now receive strict protection.

Acknowledgements:

The author is grateful to Sri M.K. Chowdhury, Conservator of Forests, Wild Life for his encouragement. Sri Rathin Banerjee, Forest Ranger in charge of Bhagabatpur crocodile farm kindly supplied the later growth data.

Thanks to Mr.M.G. Bhowmick, Assistant Wild Life Warden for rendering active help in egg collection from Kanak island.

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Pranabes Sanyal, IFS
Field Director
Sundarbans Tiger Reserve
West Bengal.

WATCH FROGS

Frogs may be among the most important and sensitive early warning systems for environmental pollution, according to recent Australian research. Aquatic pollutants may interfere with the complex cell divisions of the egg and the elaborate growth processes of the tadpoles sufficiently enough to alter the shape and form of parts of the body resulting in abnormalities. The research has revealed that abnormalities occur naturally in any population of frogs to a degree of about 0.5 to 1.2% . A higher percentage indicates aquatic pollution - (from Livestock Adviser, January, '1984)

C R O C O D I L E

Jaws III changes residence

On July 7 we transferred our largest crocodile - the 4m long salty "Jaws-III" - to a smaller pen to enable the visiting public to gank at him better. The whole operation took 2 hours and involved 20 men, some of them of doubtful valour. Nobody lost appendages much to the disappointment, no doubt, of the visiting public.

The picture on the back cover shows the "titanic struggle involved in the operation" (quotes, Indian Express). While Macho Munuswamy has anchored his rope securely on jaws, jaws Brave Bhoopathy seems to have missed the point completely and can be seen lassoing Munuswamy's rope instead. Practical Panja looks over Boopathy's shoulder from a safe distance while the Director can be seen shouting encouragement (also from a safe distance). After this initial bit of confusion things went off smoothly with "Jaws III" being successfully lassoed, netted and finally, carried off on a casuarina pole stretcher to his new pen, where to this day, he lives happily.

ANNOUNCING
THE
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CURRENT JANUARY 1, 1984
BY
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MUGGER BREEDING RESULTS AT MADRAS CROCODILE BANK TRUST 1984

S.No.	Female Name	No. of eggs	Average Length	Laid on	Hatched between	No. Hatched	No. rotten/infertile	Per-centage	Remarks
Pit 8									
1	Metty	43	74.5	18/2/84	24/4-27/4	16	27	37.2	---
2	Amara	21	72.52	19/2/84	-	-	21	0	Apparently infertile
3	Misty	26	80.9	19/2/84	28/4-3/5	17	9	68.1	Time of Laying 20.35 to 21.45
4	Vijaya	28	77.0	28/2/84	7/5/23/5	27	1	96.42	Time of Laying 22.45 to 23.40
5	Nova	35	75.2	2/3/84	5/5-14/5	30	5	85.71	Time of Laying 04.05 to 04.45
6	Stumpy	36	75.3	3/3/84	14/5-16/5	32	4	86.0	Time of Laying 22.20 to 23.00
7	Blackie	37	78.7	7/3/84	8/5/84	30	7	81.08	Time of Laying 00.25 to 00.55
8	Metty	30	81.48	23/3/84	25/5-26/5	5	18	21.7	Time of Laying 22.40 to 23.25
9	Misty	30	81.8	29/3/84	29/5	9	21	30	Time of Laying 22.20 to 22.55
10	Blackie	30	74.2	16/4/84	30/6	1	29	3.3	Time of Laying 21.45 to 22.30
11	Vijaya	28	72.1	19/4/84	26/6	5	23	13.1	Time of Laying 20.30 to 20.50
12	Stumpy	37	72.9	19/4/84	24/6 to 25/6	27	10	72.97	Time of Laying 20.50 to 21.30
13	Nova (?)	23	-	-	16/7(?)	8	15	34	---

S.No.	Female Name	No. of eggs	Average Length	Laid on	Hatched between	No. Hatched	No. rotten/infertile	Percentage	Remarks
<u>Pit 7</u>									
1	?	9	69.9	?	-	0	9	0	Infertile
2	?	13	62.0	?	-	0	13	0	Infertile
<u>Pit 10</u>									
1	?	25	67.84	?	1/5-6/5	19	6	68	-
2	?	8	75.2	?	-	-	8	0	Infertile
3	?	19	68.0	?	-	-	19	0	Infertile
4	?	29	68.71	?	7/5/15/5	24	5	82.8	-
5	?	13	70.1	?	24/6	8	5	61.5	-
6	?	21	70.7	?	30/6	2	19	10.5	-

V. Shyam Sundar
C/o, Madras Crocodile Bank Trust
Vadanemmel Village
Mahabalipuram.

NOTE:- MOST OF THE ABOVE WERE FIRST
YEAR NESTERS

COMING!

A new reprint of HERPETOLOGY OF ARABIA by JOHN ANDERSON will shortly become available from the SOCIETY FOR THE STUDY OF AMPHIBIANS & REPTILES (SSAR). Here's the review:

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by

WHIT GIBBONS

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Whit Gibbons is associate research ecologist with the Savannah River Ecology Laboratory of the University of Georgia.

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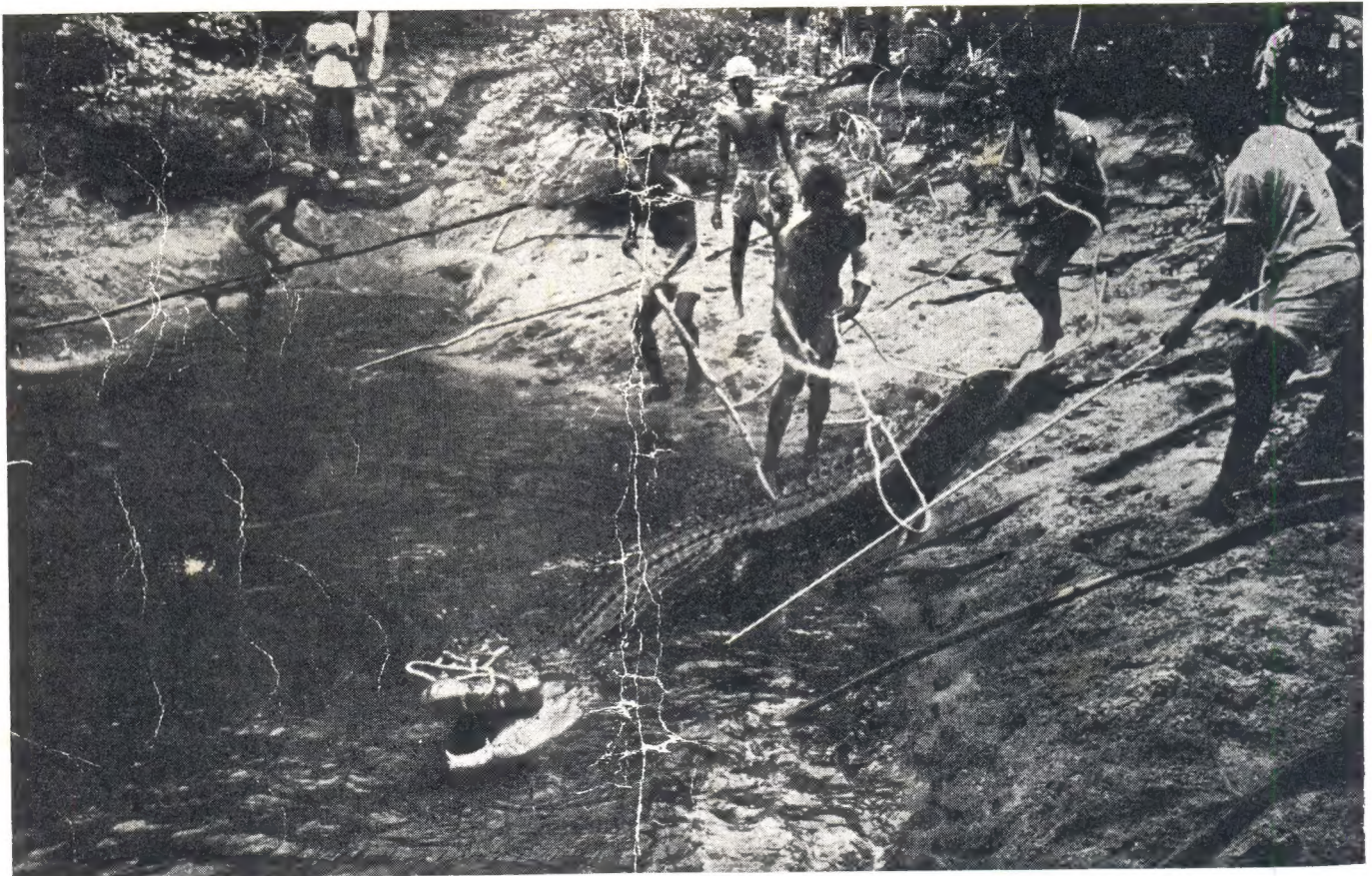
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The capture of 'Jaws III'

Photos by Shekar Dattatri

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